

Trend Study 27-12-03

Study site name: Moons Landing.

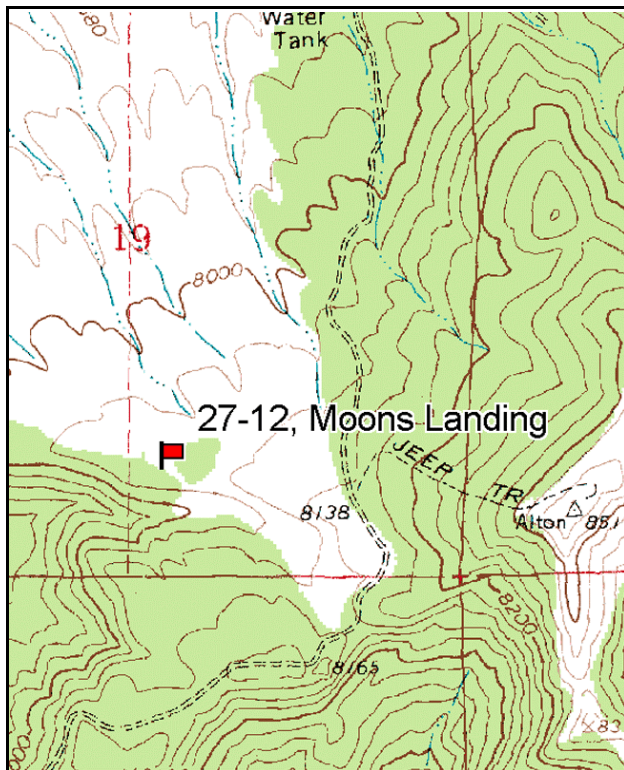
Vegetation type: Mountain Brush.

Compass bearing: frequency baseline 345 degrees magnetic. (Line 4-8°M, line 5-20°M).

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Rebar: belt 2 on 6ft, belt 3 on 4ft, belt 4 on 1ft, belt 5 on 2ft.

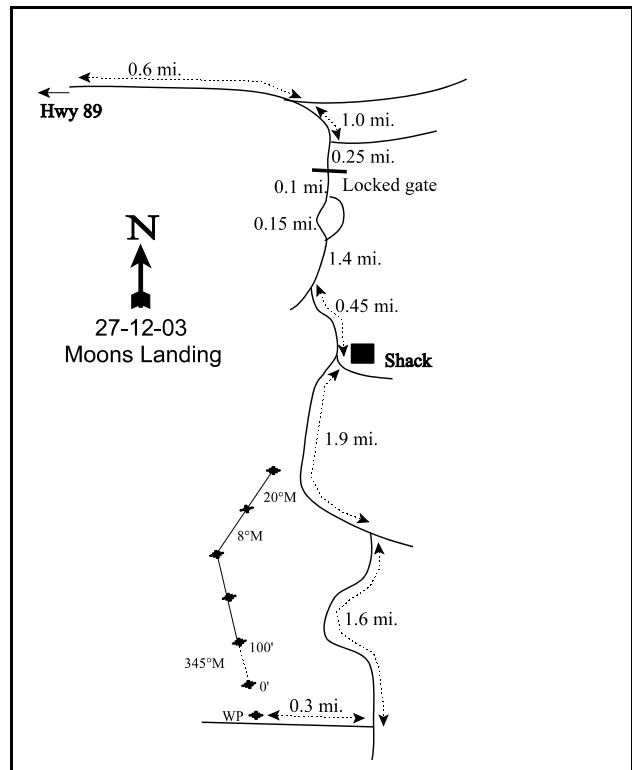
LOCATION DESCRIPTION

From U. S. 89, go approximately 0.4 miles south of mile marker #111 to a road on the left. Go 0.6 miles to a fork. Stay on Bryce Road (right) and go 1.0 mile to a fork. Stay left and go 0.25 to a locked gate (get combination). Go through the gate and go 1.65 miles, staying on the main road, to a fork. Go right 0.45 miles to another fork with a shack on the left. Go right for 1.9 miles to a fork. Turn right and go 1.6 miles to a two track road on the right. Go 0.3 miles on the two track to a witness post on the right (north). The 0-foot stake is 15 feet north of the witness post. The study is marked by green, steel fenceposts approximately 12-18 inches in height.



Map name: Alton

Township 38S, Range 5W, Section 19



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4149689 N, 371112 E

DISCUSSION

Moons Landing - Trend Study No. 27-12

This site was established in 1997 to monitor transitional/summer range on the west side of the Paunsaugunt wildlife management area. It samples a mountain brush type 2 miles east of U.S. 89 and about 4 miles north of Alton. The land is privately owned and part of the Heaton private hunting unit. The transect was placed on a gently sloping ridge with a northwest aspect at an elevation of about 8,100 feet. Pellet group transect data showed heavy deer use on the area with an estimated 192 deer days use/acre (474 ddu/ha) in 1997. Several deer were seen in the area during study establishment. Deer use declined but remained high at an estimated 96 days use/acre (238 ddu/ha) in 2003. Elk also use the area but to a much lesser extent. Elk use was estimated at 14 days use/acre (35 edu/ha) in 1997, with no elk pellets being sampled in 2003. Cattle had been on the site during both readings with use estimated at 43 days use/acre (106 cdu/ha) in 1997 and 15 days use/acre (36 cdu/ha) in 2003. A deer fawn and a sage grouse were seen on the site in 2003.

The soil is moderately deep with an average effective rooting depth of about 15 inches. Texture is a sandy clay loam with a moderately acidic pH (5.9). Rocks and pavement are not abundant on the surface or in the profile. The presence of both black sagebrush (often found in shallow soils) and mountain big sagebrush (deep rooted species) suggest some sort of rooting barrier, either physical or physiological, not discovered by the soil penetrometer. Erosion on the ridge is minimal due to the abundant vegetation and litter cover combined with the gentle terrain. Between 1997 and 2003, vegetation and litter cover declined and bare ground increased from 7% to 22%. An erosion condition class assessment completed on site in 2003 resulted in a stable soil rating.

The site supports a variety of useful browse species including serviceberry, black sagebrush, mountain big sagebrush, and bitterbrush. There are also some oak clones nearby which provide cover and additional forage. The most important shrub on the site is bitterbrush which provided over 40% of the browse cover in 1997 and 2003. Bitterbrush density was estimated at 1,860 plants/acre in 1997, increasing to 2,160 plants/acre in 2003. Eighty percent or more of the population was classified as mature in 1997 and 2003, and decadence was low in both years at 6% and 11% respectively. These shrubs have been severely hedged to the point where many are partly or totally unavailable due to hedging. Most plants still have good leader growth and seed production, and vigor was normal in both surveys. Black sagebrush and mountain big sagebrush are both found on the site in moderate numbers. Many of the sagebrush plants on the site are likely hybrids between the 2 species, but were split according to growth form. Black sagebrush density numbered 980 plants/acre in 1997 and 1,540 plants/acre in 2003. Mountain big sagebrush density was estimated at 560 plants/acre in 1997 and 880 plants/acre in 2003. Both sagebrush populations showed mostly light use, good vigor, and low decadence in both 1997 and 2003. Snowberry provides about 1/4 of the browse cover on the site. Mature plants are fairly large averaging about 2 feet in height with a crown diameter of just over 3 feet in 2003. Snowberry usually receives little use on most areas, but here, some plants displayed moderate to heavy utilization. Serviceberry are rare but heavily hedged.

Stickyleaf low rabbitbrush, an increaser, is widespread on the site with an estimated density of over 2,000 plants/acre. The population appears stable with a majority of the plants being mature in both 1997 and 2003. A small number of dwarf rabbitbrush and white rubber rabbitbrush also persist on the site.

The herbaceous understory is diverse with a fairly abundant perennial grass component. Letterman needlegrass was the most common grass in 1997 and 2003 although it significantly decreased between the 2 surveys. Other fairly common species include mutton bluegrass, Sandberg bluegrass, and needle-and-thread. Of these, needle-and-thread grass and mutton bluegrass increased significantly in nested frequency in 2003, while Sandberg bluegrass significantly declined. Cattle had utilized most of the grasses in the open areas in 1997. Less abundant grasses include slender wheatgrass, blue grama, prairie junegrass, and bottlebrush

squirreltail. Forbs are also diverse with 30 species being sampled between the 2 surveys. Perennial forbs are more abundant than annual varieties with redroot eriogonum, longleaf phlox, Louisiana sagebrush, and pale agoseris being the most abundant. Total forb cover was about 4% in both 1997 and 2003.

1997 APPARENT TREND ASSESSMENT

The soil is well protected by vegetation and litter cover. This, combined with the gentle terrain, limit erosion to localized areas. The key browse on the site, bitterbrush, appears to have a stable population but current use is extremely heavy. If this degree of use continues over several years, it could cause a downward trend. The other important browse species, black sagebrush, mountain big sagebrush and snowberry, appear to have healthy, stable populations with good vigor and low decadence. The herbaceous understory is diverse but not particularly abundant especially for forbs which make only 4% total cover. The dense shrub cover combined with livestock use will prohibit any major improvements for grasses and forbs.

2003 TREND ASSESSMENT

Trend for soil is slightly down. Bare ground increased while vegetation and litter both declined. However, erosion remains minimal and soils were given a stable rating from an erosion condition class assessment in 2003. Trend for browse is slightly up. All of the preferred species show increases in density, and maintain normal vigor and low decadence. Bitterbrush, the most preferred, still displays very heavy use, but most of the population continues to produce good leader growth and seed production. Trend for the herbaceous understory is stable overall. Trend for grasses is slightly down as the sum of nested frequency of all species has declined since 1997. Trend for forbs is slightly up as perennial species increased in sum of nested frequency since 1997. The increase in forb frequency is somewhat surprising with drought conditions experienced prior to and including the 2003 survey.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly up (4)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Management unit 27 , Study no: 12

T y p e	Species	Nested Frequency		Average Cover %	
		'97	'03	'97	'03
G	Agropyron dasystachyum	50	42	.77	.24
G	Agropyron trachycaulum	7	7	.18	.09
G	Bouteloua gracilis	31	25	.91	.16
G	Bromus carinatus	2	2	.00	.03
G	Carex spp.	_b 19	_a 3	.06	.03
G	Koeleria cristata	24	29	.24	.30
G	Poa fendleriana	_a 47	_b 114	1.34	1.34
G	Poa pratensis	-	3	-	.01
G	Poa secunda	_b 133	_a 80	1.30	1.40
G	Sitanion hystrix	32	20	.30	.32
G	Stipa comata	_a 95	_b 133	1.57	2.22
G	Stipa lettermani	_b 305	_a 157	11.75	3.38
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		745	615	18.45	9.55
Total for Grasses		745	615	18.45	9.55
F	Agoseris glauca	_a 3	_b 31	.00	.29
F	Alyssum alyssoides (a)	-	6	-	.09
F	Allium spp.	4	1	.01	.00
F	Antennaria rosea	1	3	.00	.18
F	Androsace septentrionalis (a)	_a -	_b 33	-	.41
F	Arabis spp.	-	2	-	.00
F	Artemisia dracunculus	3	5	.03	.19
F	Artemisia ludoviciana	88	76	1.41	.63
F	Balsamorhiza sagittata	1	2	.15	.15
F	Calochortus nuttallii	-	4	-	.01
F	Cirsium spp.	4	4	.03	.06
F	Crepis acuminata	_a -	_b 9	-	.05
F	Descurainia pinnata (a)	-	-	-	.00
F	Epilobium brachycarpum (a)	_a 1	_b 23	.00	.03
F	Erigeron eatonii	-	-	-	.00
F	Erigeron flagellaris	15	7	.36	.06
F	Eriogonum racemosum	_b 118	_a 80	1.52	1.19
F	Eriogonum umbellatum	_a 6	_b 17	.18	.23
F	Lappula occidentalis (a)	-	1	-	.00
F	Lomatium spp.	5	8	.01	.01

T y p e	Species	Nested Frequency		Average Cover %	
		'97	'03	'97	'03
F	<i>Lychnis drummondii</i>	4	2	.03	.01
F	<i>Microsteris gracilis</i> (a)	-	4	-	.01
F	<i>Orthocarpus luteus</i> (a)	-	3	-	.03
F	<i>Phlox longifolia</i>	_a 33	_b 80	.10	.17
F	<i>Polygonum douglasii</i> (a)	_b 62	_a 4	.18	.01
F	<i>Potentilla gracilis</i>	1	2	.03	.03
F	<i>Senecio</i> spp.	-	-	-	.00
F	<i>Stellaria jamesiana</i>	-	2	-	.00
F	<i>Taraxacum officinale</i>	5	-	.06	-
F	<i>Tragopogon dubius</i>	6	9	.02	.04
Total for Annual Forbs		63	74	0.18	0.61
Total for Perennial Forbs		297	344	3.97	3.35
Total for Forbs		360	418	4.16	3.96

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 27 , Study no: 12

T y p e	Species	Strip Frequency		Average Cover %	
		'97	'03	'97	'03
B	<i>Amelanchier utahensis</i>	0	2	-	.15
B	<i>Artemisia nova</i>	14	20	2.55	2.40
B	<i>Artemisia tridentata vaseyana</i>	15	25	2.17	2.33
B	<i>Chrysothamnus depressus</i>	12	8	.73	1.28
B	<i>Chrysothamnus nauseosus hololeucus</i>	10	3	.51	.18
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	53	47	5.56	4.54
B	<i>Gutierrezia sarothrae</i>	0	10	-	.10
B	<i>Mahonia repens</i>	4	3	.00	-
B	<i>Purshia tridentata</i>	58	60	17.35	15.26
B	<i>Quercus gambelii</i>	4	4	1.16	1.16
B	<i>Ribes</i> spp.	2	2	.15	.15
B	<i>Rosa woodsii</i>	0	2	.15	.03
B	<i>Symphoricarpos oreophilus</i>	30	32	10.24	7.28
B	<i>Tetradymia canescens</i>	2	4	-	.03
Total for Browse		204	222	40.59	34.93

CANOPY COVER, LINE INTERCEPT --
Management unit 27 , Study no: 12

Species	Percent Cover	
	'97	'03
Amelanchier utahensis	-	.06
Artemisia nova	-	5.25
Artemisia tridentata vaseyana	-	2.90
Chrysothamnus depressus	-	.56
Chrysothamnus nauseosus hololeucus	-	.18
Chrysothamnus viscidiflorus viscidiflorus	-	7.71
Gutierrezia sarothrae	-	.21
Purshia tridentata	-	17.45
Quercus gambelii	2.20	2.79
Ribes spp.	-	.66
Symphoricarpos oreophilus	-	8.19
Tetradymia canescens	-	.16

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 27 , Study no: 12

Species	Average leader growth (in)
	'03
Artemisia tridentata vaseyana	1.3
Purshia tridentata	2.8

BASIC COVER --
Management unit 27 , Study no: 12

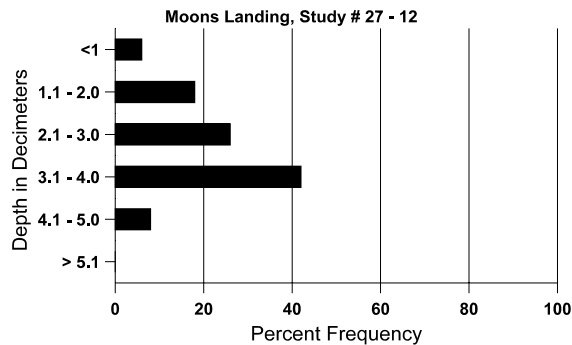
Cover Type	Average Cover %	
	'97	'03
Vegetation	62.22	49.17
Rock	1.33	2.29
Pavement	1.18	.93
Litter	55.81	42.33
Cryptogams	.49	.03
Bare Ground	7.05	21.55

SOIL ANALYSIS DATA --

Management unit 27, Study no: 12, Study Name: Moons Landing

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.4	64.0 (9.5)	5.9	64.0	16.1	19.9	2.7	19.1	134.4	0.4

Stoniness Index



PELLET GROUP DATA --

Management unit 27 , Study no: 12

Type	Quadrat Frequency		Days use per acre (ha)
	'97	'03	
Rabbit	3	11	-
Elk	8	-	-
Deer	45	34	96 (238)
Cattle	14	4	15 (36)

BROWSE CHARACTERISTICS --

Management unit 27 , Study no: 12

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Amelanchier utahensis											
97	0	-	-	-	-	-	0	0	-	0	93/78
03	40	-	20	20	-	-	0	50	-	0	4/17
Artemisia nova											
97	980	420	460	440	80	80	14	4	8	6	18/36
03	1540	-	500	960	80	20	1	1	5	0	22/26
Artemisia tridentata vaseyana											
97	560	100	280	240	40	60	14	0	7	4	26/38
03	880	40	380	400	100	40	14	5	11	5	25/29

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Chrysothamnus depressus											
97	760	-	180	580	-	-	0	0	-	0	4/8
03	380	-	-	380	-	-	47	53	-	0	6/10
Chrysothamnus nauseosus hololeucus											
97	360	-	20	340	-	-	0	0	-	0	12/16
03	60	-	-	60	-	-	0	0	-	0	12/17
Chrysothamnus viscidiflorus viscidiflorus											
97	2080	-	260	1820	-	40	0	0	0	0	19/27
03	2220	-	80	2120	20	20	0	0	1	0	19/26
Gutierrezia sarothrae											
97	0	-	-	-	-	-	0	0	-	0	-/-
03	460	-	-	460	-	-	0	0	-	0	6/7
Mahonia repens											
97	200	-	-	200	-	-	0	0	-	0	3/6
03	140	-	-	140	-	-	0	0	-	0	3/6
Purshia tridentata											
97	1860	20	260	1480	120	100	25	70	6	1	23/70
03	2160	-	80	1840	240	40	16	78	11	2	20/46
Quercus gambelii											
97	500	80	360	120	20	-	32	0	4	4	98/32
03	480	-	100	380	-	-	8	54	0	0	70/29
Ribes spp.											
97	40	-	-	40	-	-	50	0	0	0	46/61
03	40	-	-	20	20	-	50	50	50	0	53/52
Rosa woodsii											
97	0	-	-	-	-	-	0	0	-	0	-/-
03	40	-	20	20	-	-	0	0	-	0	16/9
Symphoricarpos oreophilus											
97	880	-	60	820	-	-	59	9	0	0	25/57
03	1280	-	80	1140	60	-	11	9	5	2	20/40
Tetradymia canescens											
97	80	20	60	20	-	-	0	0	-	0	10/13
03	160	-	60	100	-	-	0	0	-	0	15/16